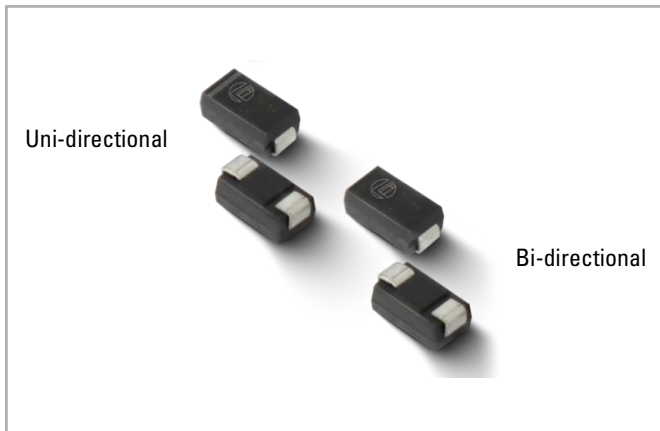


P6SMA-Q Series

Surface Mount – 600W



Additional Information



Resources



Accessories



Samples

Maximum Ratings and Thermal Characteristics

($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000 μs Waveform(Fig.1)(Note 1)(Note 2) -Single Die Parts	P_{PPM}	600	W
Power Dissipation on Infinite Heat Sink at $T_L=50^{\circ}\text{C}$	P_D	5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I_{FSM}	60	A
Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only	V_F	3.5	V
Operating Temperature Range	T_J	-55 to 150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to 150	$^{\circ}\text{C}$
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	30	$^{\circ}\text{C}/\text{W}$
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	120	$^{\circ}\text{C}/\text{W}$

Notes:

- Non-repetitive current pulse, per Fig.3 and derated above T_J (initial) $=25^{\circ}\text{C}$ per Fig.2.
- Mounted on 5.0x5.0mm copper pad to each terminal.
- Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only.

Description

The P6SMA-Q series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

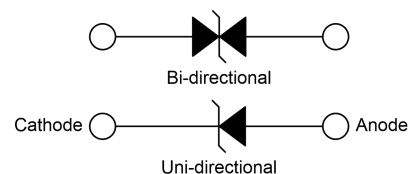
Features

- High reliability application and automotive grade AEC-Q101 qualified
- 600W peak pulse power capability at 10/1000 μs waveform, repetition rate (duty cycles):0.01%
- Excellent clamping capability
- Typical I_R less than 1 μA when $V_B \text{ min} > 12\text{V}$
- Surface mount footprint for compact PCB layout
- Low profile package
- Typical failure mode due to exceeding maximum ratings is a short circuit condition
- Whisker test conducted based on Table 4a and 4c of JEDEC JESD201A
- ESD protection of data lines in accordance with IEC 61000-4-2, 30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC61000-4-4
- Built-in strain relief
- Fast response time: typically less than 1.0ps from 0V to $V_B \text{ min}$
- High temperature to reflow soldering guaranteed: 260 $^{\circ}\text{C}/20\sim 40\text{sec}$.
- $V_B @ T_J = V_B @ 25^{\circ}\text{C} \times (1 + \alpha T)$ (α T:Temperature Coefficient, typical value is 0.1%)
- Meet MSL level1, per J-STD-020, LF maximum peak of 260 $^{\circ}\text{C}$
- Matte tin, lead-free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD 609A.01)

Applications

TVS devices are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in Telecom, Computer, Industrial and Consumer electronic applications.

Functional Diagram



P6SMA-Q Series

Surface Mount – 600W

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Part Number		Type	Device Marking Code		Reverse Stand-Off Voltage $V_R(\text{V})$	Breakdown Voltage @ I_T		Test Current $I_T(\text{mA})$	Maximum Clamping Voltage @ I_{PP} $V_C(\text{V})$	Peak Pulse Current $I_{PP}(\text{A})$	Reverse Leakage @ V_R $I_R(\mu\text{A})$
Uni.	Bi.		Uni.	Bi.		$V_{B \text{ Min.}}(\text{V})$	$V_{B \text{ Max.}}(\text{V})$				
P6SMA6.8A	P6SMA6.8CA	Q	6V8A•	6V8C•	5.80	6.45	7.14	10	10.5	58.1	1000
P6SMA7.5A	P6SMA7.5CA	Q	7V5A•	7V5C•	6.40	7.13	7.88	10	11.3	54.0	500
P6SMA8.2A	P6SMA8.2CA	Q	8V2A•	8V2C•	7.02	7.79	8.61	10	12.1	50.4	200
P6SMA9.1A	P6SMA9.1CA	Q	9V1A•	9V1C•	7.78	8.65	9.55	1	13.4	45.5	50
P6SMA10A	P6SMA10CA	Q	10A•	10C•	8.55	9.50	10.50	1	14.5	42.1	10
P6SMA11A	P6SMA11CA	Q	11A•	11C•	9.40	10.50	11.60	1	15.6	39.1	5
P6SMA12A	P6SMA12CA	Q	12A•	12C•	10.20	11.40	12.60	1	16.7	36.5	5
P6SMA13A	P6SMA13CA	Q	13A•	13C•	11.10	12.40	13.70	1	18.2	33.5	1
P6SMA15A	P6SMA15CA	Q	15A•	15C•	12.80	14.30	15.80	1	21.2	28.8	1
P6SMA16A	P6SMA16CA	Q	16A•	16C•	13.60	15.20	16.80	1	22.5	27.1	1
P6SMA18A	P6SMA18CA	Q	18A•	18C•	15.30	17.10	18.90	1	25.2	24.2	1
P6SMA20A	P6SMA20CA	Q	20A•	20C•	17.10	19.00	21.00	1	27.7	22.0	1
P6SMA22A	P6SMA22CA	Q	22A•	22C•	18.80	20.90	23.10	1	30.6	19.9	1
P6SMA24A	P6SMA24CA	Q	24A•	24C•	20.50	22.80	25.20	1	33.2	18.4	1
P6SMA27A	P6SMA27CA	Q	27A•	27C•	23.10	25.70	28.40	1	37.5	16.3	1
P6SMA30A	P6SMA30CA	Q	30A•	30C•	25.60	28.50	31.50	1	41.4	14.7	1
P6SMA33A	P6SMA33CA	Q	33A•	33C•	28.20	31.40	34.70	1	45.7	13.2	1
P6SMA36A	P6SMA36CA	Q	36A•	36C•	30.80	34.20	37.80	1	49.9	12.2	1
P6SMA39A	P6SMA39CA	Q	39A•	39C•	33.30	37.10	41.00	1	53.9	11.3	1
P6SMA43A	P6SMA43CA	Q	43A•	43C•	36.80	40.90	45.20	1	59.3	10.3	1
P6SMA47A	P6SMA47CA	Q	47A•	47C•	40.20	44.70	49.40	1	64.8	9.4	1

Notes:For bidirectional type having V_R of 10 volts and less, the I_R limit is double. $V_B @ T_J = V_B @ 25^{\circ}\text{C} \times (1 + \alpha T \times (T_J - 25))$ (αT : Temperature Coefficient)

P6SMA-Q Series

Surface Mount – 600W

Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1:
Peak Pulse Power Rating Curve

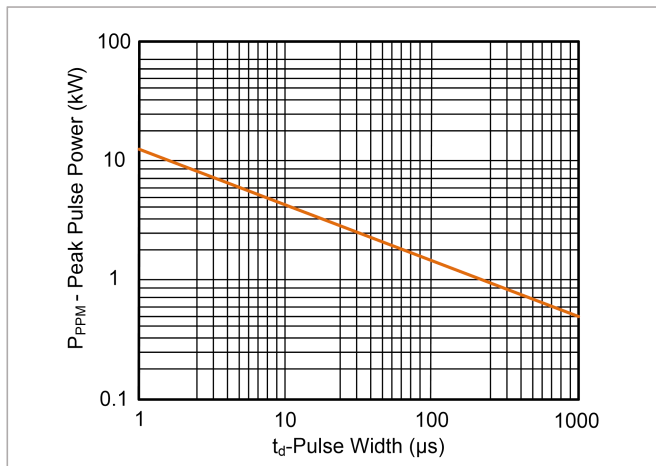


Figure 2:
Pulse Derating Curve

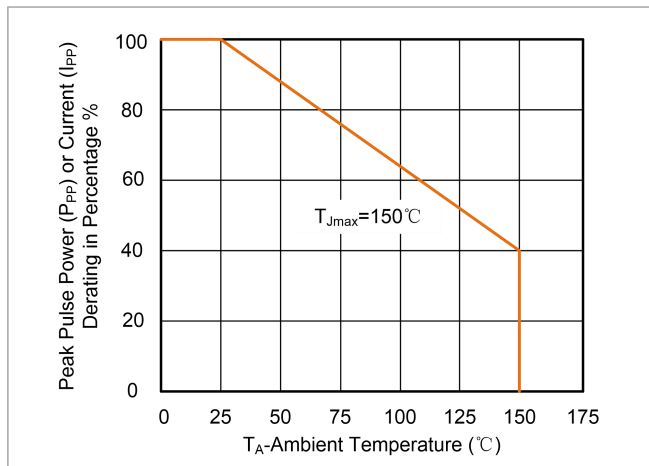


Figure 3:
Pulse Waveform

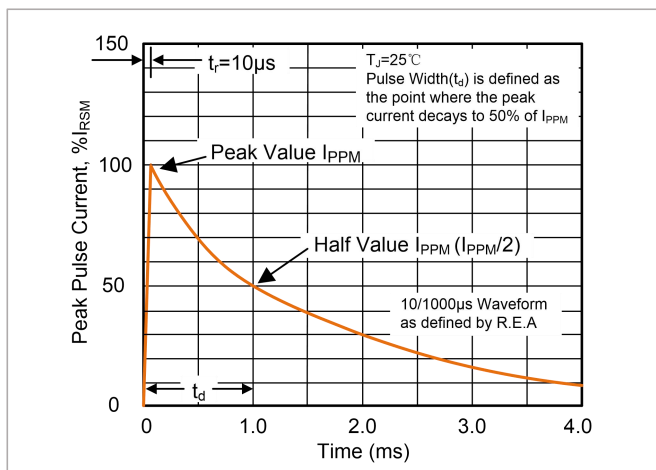


Figure 4:
Typical Junction Capacitance

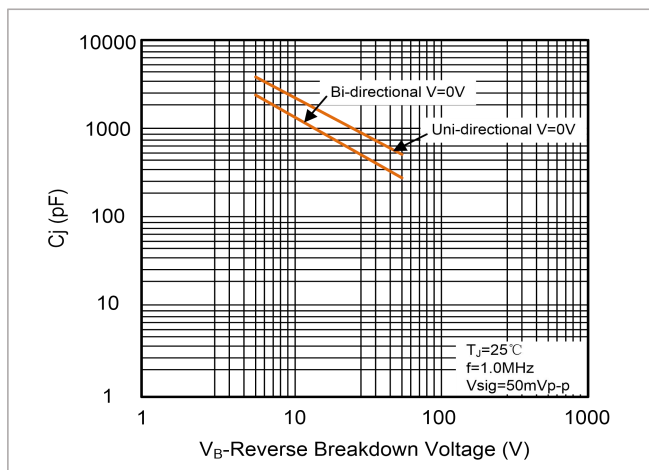


Figure 5:
Steady State Power Dissipation Derating Curve

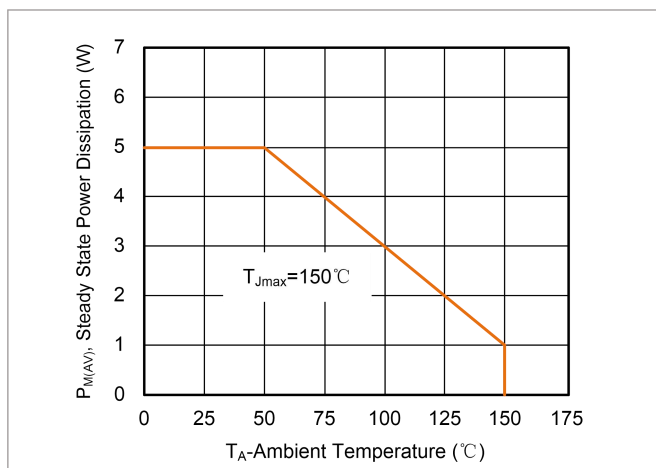
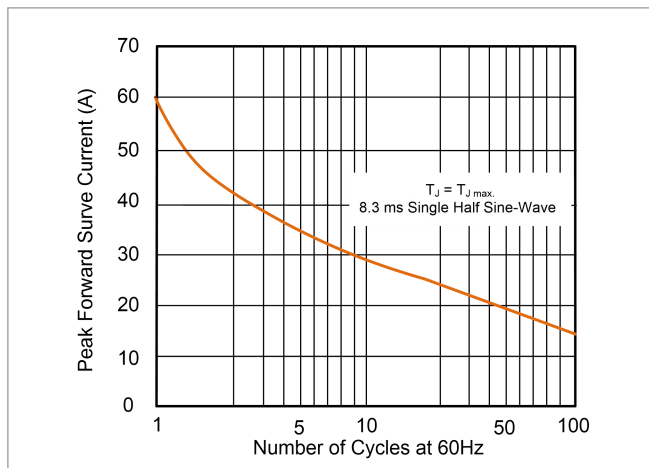


Figure 6:
Maximum Non-Repetitive Forward Surge Current Uni-Directional

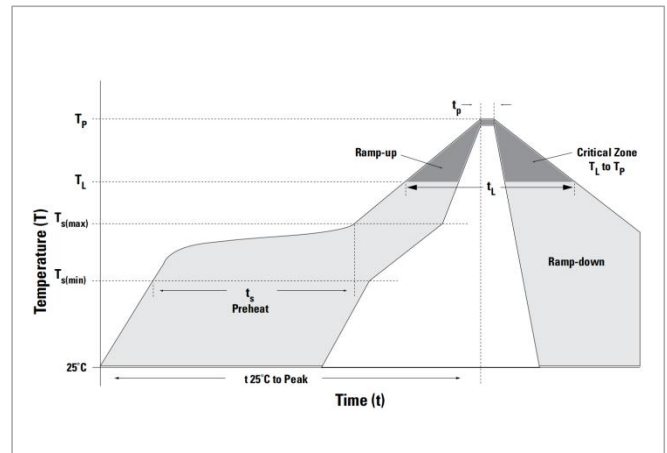


P6SMA-Q Series

Surface Mount – 600W

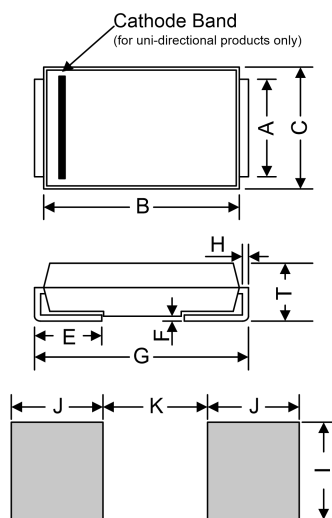
Soldering Parameters

Reflow Condition		Lead-free assembly
Pre Heat	-Temperature Min ($T_{S\ min}$)	150°C
	-Temperature Max ($T_{S\ max}$)	200°C
	-Time (min to max) (t_s)	60 – 180 secs
Average ramp-up rate(Liquidus Temp (T_L) to peak		3°C/second max.
$T_{S\ (max)}$ to T_L-Ramp-up Rate		3°C/second max.
Reflow	-Temperature (T_L) (Liquidus)	217°C
	-Time (min to max) (t_L)	60-150 seconds
Peak Temperature (T_P)		260°C
Time within 5°C of actual Peak Temperature (t_p)		20-40 seconds
Ramp-down Rate		6°C/second max.
Time 25°C to Peak Temperature		8 minutes max.
Do not exceed		260°C



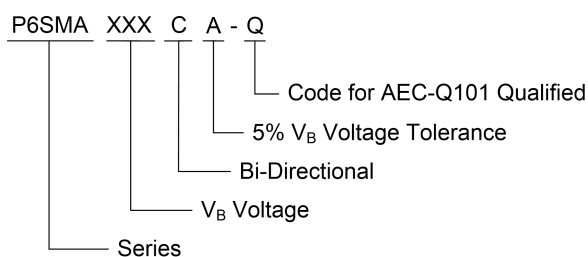
Dimensions

DO-214AC (SMA)

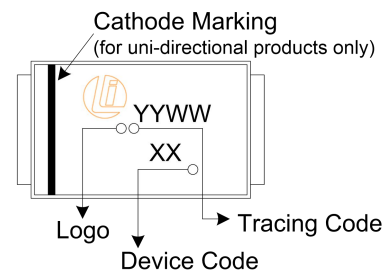


Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.250	1.650	0.049	0.065
B	3.990	4.600	0.157	0.181
C	2.400	2.790	0.095	0.110
E	0.780	1.520	0.030	0.060
F	-	0.203	-	0.008
G	4.800	5.280	0.189	0.208
H	0.152	0.305	0.006	0.012
T	1.900	2.290	0.075	0.090
I	1.800	-	0.070	-
J	2.100	-	0.082	-
K	-	2.300	-	0.090

Part Numbering System



Part Marking System



P6SMA-Q Series

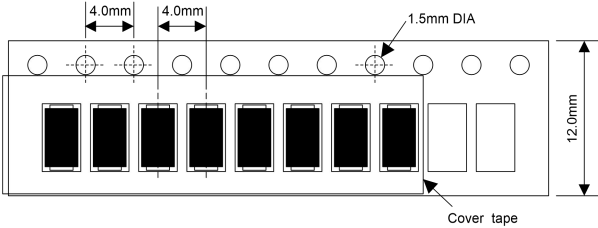
Surface Mount – 600W

Packaging

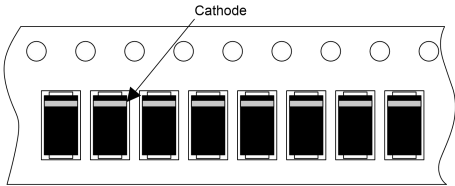
Part number	Component Package	Quantity	Packaging Option	Packaging Specification
P6SMAxxxXX-Q	DO-214AC	5000	Tape & Reel - 12mm tape/13" reel	EIA STD RS-481

Tape and Reel Specification

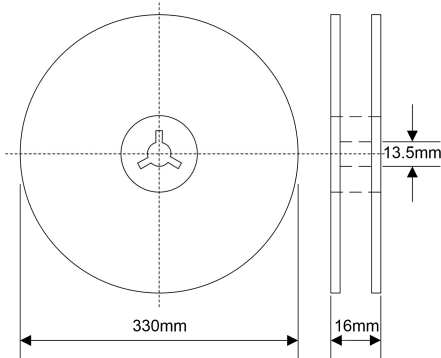
Tape



For Uni-Devices



13 Inches Reel



Quantity: 5000pcs/reel

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